## ABSTRACT

A method for producing olefins by oxidative dehydrogenation. In one embodiment, the method comprises feeding a feed to a reactor comprising a catalyst, wherein the feed comprises oxygen, and a carbonaceous material comprising carbon monoxide and a light hydrocarbon; contacting the feed to the catalyst in the reactor; and converting at least a portion of the light hydrocarbon with oxygen to at least one olefin, while simultaneously converting at least a portion of the carbonaceous material with oxygen to carbon dioxide to form a product stream comprising the at least one olefin and by-products. The by-products comprise at least carbon monoxide. In other embodiments, at least a portion of the by-products, which comprise carbon monoxide, is recycled to the reactor. In further embodiments, the light hydrocarbon feed comprises ethane, and the olefin comprises ethylene.